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SCIENCE NEWS LETTER

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Future Fryer

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1946

PHYSICS

Measurement Standard

Transmutation of gold into mercury in the cyclotron has produced a standard which is ten times as accurate as the one now accepted.

➤ BY THE TRANSMUTATION of gold into mercury in the cyclotron—a reversal of the alchemists' dream—University of California scientists have produced a standard for the measurement of length which is proving itself to be ten times as accurate as the one now accepted.

The standard for measurement is a spectrum line—at present a red light ray produced by making the atoms of cadmium glow.

The new standard is a sharp green light ray produced by exciting the atoms of the transmuted mercury in a quartz tube with a high frequency radio beam until they give light.

Measurements can be made with the green light ray with an accuracy of billionths of an inch. The standard of measurement is used in the grinding of lenses and prisms, in the testing of nearly all optical equipment, and in a vast number of scientific experiments requiring precise measurements.

The special type of mercury made from gold is the isotope, or "sister", in the mercury family with the atomic weight 198. It is produced by bombarding gold atoms with neutrons. The gold atoms "capture" neutrons, becoming radioactive, and, after emitting electrons, turning into mercury 198.

Ordinary mercury has a number of isotopes, and when it is made to glow each isotope emits a slightly different light, much as there are a number of different notes in a chord played on a piano. A spectroscope separates the light into its component parts, a light ray being present for each isotope.

Gold is transmuted into mercury 198 of such purity that less than one atom in a million is other than mercury 198. Therefore the sharp green line of mercury 198 is produced with great clarity and sharpness, undiluted by the light of other mercury isotopes, much as a single note on a piano is struck. Its wave length does not vary by more than one fifty-billionth of an inch.

About five milligrams—half a cent's worth—of gold is used in the transmutation of enough mercury to make a "lamp" for mercury measurement standard. The Berkeley scientists estimate that hundreds of thousands of times as much mercury 198 could be produced by using the "pile" technique used in the atomic bomb project as can be produced in cyclotron bombardment.

The superiority of the mercury measurement to that of cadmium is due partially to the fact that mercury atoms are heavier and can be made to glow at temperatures below freezing. Heat makes atoms move faster, and lighter atoms move more than heavy ones. The lightness of cadium atoms plus the fact that they must be heated to 300 degrees centigrade to produce the red light ray result in a fuzzier line than the mercury ray.

The cadmium standard of length was adopted in 1893 as the primary standard of length, and had not been improved on until the mercury ray was produced. The Berkeley scientists believe it will be possible to produce a mercury "lamp" which can be plugged into a 110 volt alternating current outlet. This is much simpler than the cadmium equipment, which requires a furnace.

Mercury for a dozen lamps has been produced in cyclotron bombardments. Several lamps have been sent to the Bureau of Standards for experimentation, some have been sent to the Eastman Kodak Company, while others are used in university laboratories.

Transmutation of gold into mercury 198 was accomplished by Dr. Jacob H. Wiens, now a staff engineer of the U. S. Electronics Research Laboratory on the Berkeley campus, and Dr. Luis Alvarez, professor of physics and one of the nation's leading young atomic scientists.

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PHYSICS

"Baby" Betatron Produces Inexpensive Radiations

➤ RADIATIONS equal to three grams of radium are produced at one-tenth the cost of radium by a four-million volt, "baby" betatron built at the University of Illinois.

Smaller and simpler than the push-button controlled 20-million volt betatron, the new device is expected to be used for X-ray work in science and industry.

"It can be used in place of radium for taking X-rays, but has the advantage of an initial cost only one-tenth that of the radium to produce equal energy," declared Prof. Gerald M. Almy, who headed work on the new betatron.

The new machine is safer than radium, and concentrates its beam in one direction instead of all directions. Sharper X-ray pictures result from the betatron's pin-point beam that is more intense than any useful amount of radium, according to Prof. Almy.

Lone disadvantage reported was that the new betatron requires an operator in charge while it is running, where radium, once it is placed, requires no further attention.

The four-million volt device for science and industry consists of an electromagnet, 15 inches wide, 25 inches long and 8 inches high, mounted on a wheeled frame and arrranged so that the beam can be swung up or down. The voltage is generated from a doughnut-shaped ceramic tube 8 inches in diameter that is located inside the hollow of the rectangular electro-magnet.

Electrons released from a glowing filament in the tube are accelerated by magnetic force and hurled against a tiny ray-creating target.

The power unit, connected to the magnet by a flexible cable, is kept at least ten feet from the betatron during operation, a safe distance for the operator whose control panel is on the power unit.

Prof. Almy claims the design is so simple that any laboratory machine shop can build a "baby" betatron, three of which have been built at Urbana and at least one other, made from the same plans, has been constructed at Ohio State University.

University of Illinois scientists are now working on a giant, 250-million volt betatron expected to produce cosmic ray effects.

Built during the war, the new betatrons were produced under the auspices of the Office of Scientific Research and Development.

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E600 is a German insecticide developed during the war; some claim it is better than DDT.

There are about 300 varieties of *olive trees* from which olives and olive oil are obtained; the oil content depends not only upon the variety but upon soil and climatic conditions.

CHEMISTRY

New Elements Named

Americium and curium are the names given to the two newest elements, 95 and 96, by their co-discoverer, Dr. Glenn T. Seaborg.

➤ THE TWO NEWEST chemical elements to be discovered, numbers 95 and 96, were christened "americium" and "curium" by their co-discoverer, Dr. Glenn T. Seaborg, of the Metallurgical Laboratory, University of Chicago, in an address before the American Chemical Society meeting.

Made synthetically from uranium and plutonium as a consequence of the atomic bomb research, americium and curium were manufactured in the University of California cyclotron at Berkeley by bombarding U238 and Pu239 with 40,000,000 electron volt helium ions. Dr. Seaborg announced the discovery of these two elements last fall.

The chemical symbols of the new elements will be Am and Cm.

Element 95 is named after the Americas, or the New World, and element 96 is named after Pierre and Marie Curie, the great leaders in the study of radioactivity.

When neptunium, element 93, and plutonium, element 94, were discovered they were named after the two planets Neptune and Pluto, beyond the planet, Uranus, in the solar system, after which element 92, uranium, was named. But when two more elements were manufactured, there were no more planets of the solar system after which to name them.

So Dr. Seaborg, who was also co-discoverer of plutonium, used analogy with corresponding elements in the periodic table to guide him in naming his new chemical babies.

He found that the new elements were members of a series of elements, which he called the actinide series because its first member is actinium. This corresponds with the series of chemical elements known as the lanthanide earths which begin with lanthanum. The shells or layers of electrons in the atoms of these elements have similarities. Element 95 has six of what the chemists call 5f electrons and corresponds to the element europium, with six 4f electrons, which was named after Europe. This suggested to Dr. Seaborg naming element 95 after the Americas. Element 96 has seven 5f electrons while gadolinium, with seven 4f electrons, was named after Gadolin, a great investigator of the rare earths. This suggested naming 96 after the Curies.

The preferred pronunciation of americium, according to Dr. Seaborg, is a-mer-ic'i-um, pronouncing the "ic" like "is" in this. The name of this new element is not likely to come into such common usage as many other elements, such as plutonium, one of the fissionable atomic bomb elements, but there may be some tendency in the future to shorten or corrupt it by dropping out the second letter i as has been done in the American usage of aluminum, which in England is still known as aluminium.

Curium is simpler to pronounce, the c being sounded like k.

Co-discoverers of americium and curium with Dr. Seaborg are R. A. James, L. O. Morgan and A. Ghiorso in the Metallurgical Laboratory at the University of Chicago, one of the Manhattan (Atomic Bomb) Engineer District projects. Dr. J. G. Hamilton and his group at the University of California are credited with vital participation and cooperation throughout, rebuilding the 60-inch cyclotron to produce the high-energy particles needed, and who performed the bombardments.

Dr. Seaborg is professor of chemistry at the University of California on loan to the atomic bomb project and he will shortly return to Berkeley.

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CHEMISTRY

Anarchy in Molecules Determines Stretchability

➤ RETENTION of its stretchability by rubber depends on the maintenance of a state of internal anarchy among its molecules, Dr. W. O. Baker and Dr. N. R. Pape, of the Bell Telephone Laboratories, reported to the American Chemical Society.

X-ray studies of natural rubber stretched and stretched again until it stiffened and lost its elasticity showed that the molecules had assumed an orderly, crystal-like pattern. Types of synthetic rubber that do not thus become brittle under strain showed X-ray patterns indicating that their molecules never became really orderly.

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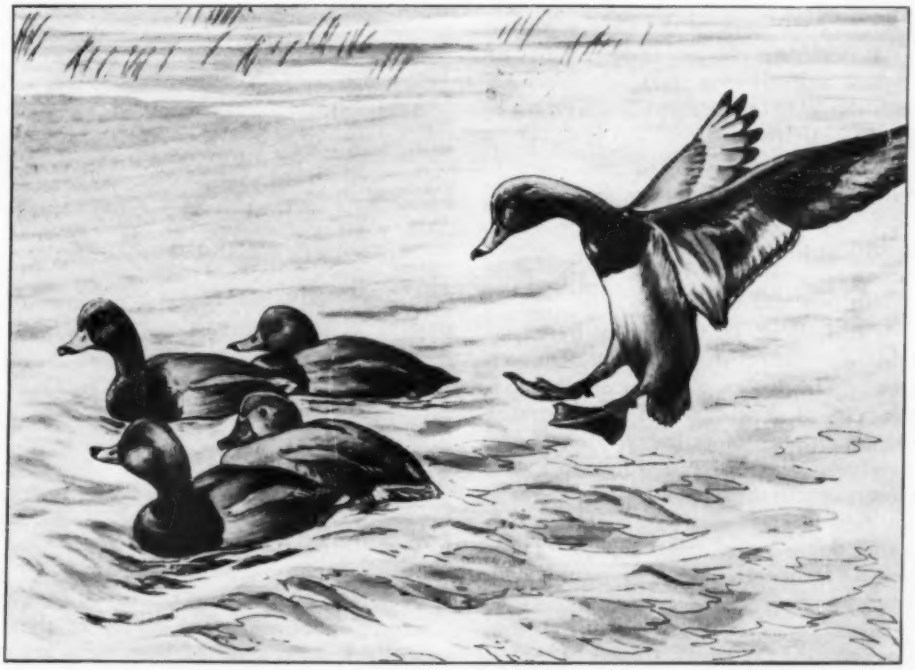

DUCK STAMP—This Federal migratory-bird hunting stamp for the 1946-47 season is taken from a drawing by Robert W. Hines and will be available to hunters and philatelists on July 1. Sold for $1, the stamps provide funds that help finance the Federal Government's refuge program.

GENERAL SCIENCE

Army "Goes Scientific"

Young officers will receive special training, young scientists to be commissioned as officers. The war demonstrated how important science is in national security.

➤ THE POSTWAR U. S. Army is going to be a much more scientific-minded organization than it was before Pearl Harbor, Secretary of War Robert P. Patterson announced, in the course of the principal address delivered before the opening session of the meeting of the American Chemical Society.

"We are setting up a long-range program to augment the number of Army personnel educated along scientific lines, not with the thought that we would be self-sufficient in these fields but in order to provide a larger group of highly skilled persons for key positions in research and development and in order to strengthen our contacts with scientists and technologists, Secretary Patterson stated.

"Three measures are involved:

"1. Commissioning in the regular army of promising graduates of advanced technical schools and universities;

"2. Sending younger army officers of demonstrated aptitude to technical schools and universities for advanced post-graduate work in the basic sciences;

"3. Offering better inducements to civilian scientists to take employment with the War Department and to remain in this activity.

"This program will succeed only if more adequate recognition by way of rank and prospects of promotion is extended to those who devote their careers to research and development, and such recognition will be given."

World War II. Secretary Patterson said, demonstrated how important science could be as a factor in national strength, as World War I demonstrated the importance of industry. One of the weightiest reasons for deciding to knock Germany out first, he disclosed, was a justified fear of what German scientists could do if given time enough. There was no comparable peril, he commented, from Japanese science.

Chemists made many direct contributions toward the better arming of America and her allies, the speaker pointed out. The most destructive of air weapons, he declared, were not high explosives, but fire bombs, which were developed by chemists, both civilians and those in the Chemical Warfare Service. Flamethrowers, also chemical weapons, figured decisively in the conquest of island stepping-stones to Japan.

The principal reason why our enemies never resorted to poison gas, Secretary Patterson asserted, was that they knew we had greater stocks of deadlier gases than they possessed. The same held true for the still-untried means of biological warfare, which were in the hands of the chemists. In passing, he took occasion again to deny the much-circulated report that the Nazis possessed a poison gas that could get through the American gas mask.

Beneficent byproducts of chemical research done in the first instance for war purposes include BAL, the British antidote for lewisite, which has been found to be a good remedy for arsenic and mercury poisoning; the higly toxic nitrogen mustard gases, which have shown beneficial effects on some types of cancer; and a compound known as di-iso-propyl-fluorophosphate, which gives promise in the treatment of glaucoma and myasthenia gravis.

In conclusion, the speaker stated, "In all planning we must embrace the scientific research potential in establishing measures for national security, until the happy day comes, if it does come, when world peace may be accepted everywhere as an accomplished fact."

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GEOLOGY

Bahama Banks May Hide Submarine Oil Field

➤ THE SHOALS of the Bahama Banks, a navigational hazard in the Atlantic Ocean east of the southern coast of Florida, may hide a submarine oil field, Prof. John L. Rich, University of Cincinnati geologist, told the American Association of Petroleum Geologists.

Reporting on an aerial survey of the area, Prof. Rich declared that the giant sand bars and ripples of the Bahama Banks bear a striking resemblance to the patterns of certain productive lenticular oil and gas sands in Ohio.

Situated between the Bahama Islands and Cuba, the shoal area has a depth varying between 6 and 30 feet. Prof. Rich flew over the region making aerial photographs from a height of 10,000 feet.

He said that a series of photogrammetric maps of giant sand ripples visible through the clear water over the shoals revealed configurations exactly like parts of the Clinton sand area in Ohio, though on a smaller scale. He urged further investigation of the Bahama Banks as a possible oil-bearing area.

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Government men state there are some 13,000 *bears* in Alaska's two national forests.

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ELECTRONICS

Cause Radio Disturbances

Speeding clouds from the sun have been discovered by a new method of observation that promises important developments in radio theory.

➤ SPEEDING CLOUDS of electrically charged gases racing from the sun into the upper layer of the earth's atmosphere have been discovered by a new method of observation that promises important developments in radio theory, H. W. Wells, J. W. Watts, and D. E. George, Carnegie Institution of Washington staff members, reported.

The clouds from the sun were discovered during the magnetic-ionospheric storms of March 25 and 26 by investigators at the Ionospheric Laboratory near Kensington, Md., using a pulse-ranging method.

The discovery indicates that ultraviolet light coming from the sun is not the only means of producing the ionized layers of air whose height and density above the earth are fundamental considerations in radio theory.

During the magnetic storms, the Carnegie Institution scientists said, the clouds of charged, or ionized matter, rush to the ionosphere, moving in from long to short range and out again in intervals of a few minutes. They come into the range of detecting instruments at heights of 500 to 600 miles above the earth at a speed of about one mile a second until they fuse with the layer of ionized air about 180 to 250 miles above the earth. Occasionally they appear to break away from that layer and move out again at about the same rate.

During these periods there are marked fluctuations in the ionosphere, and radio signals fade or disappear.

The scientists who discovered the clouds say that they are caused by a bombardment of earth's atmosphere by irregular bursts of electrically charged corpuscles, which may be likened to streams of dust from the sun.

Not to be confused with cosmic rays, these dust-like streams probably originate in or near the sunspots that are generally known to affect radio conditions.

When the clouds rush into the ionosphere, they cause sudden changes in the so-called F-layer, which will normally bounce radio waves back to the earth to permit long-distance broadcasting.

The distance that broadcasts can be heard is changed by the tendency of the newly discovered clouds to pull this reflecting layer away from the earth and then push it back. As the clouds penetrate deeper into the lower levels of the ionosphere, additional ionization causes broadcast radio waves to be absorbed instead of reflected.

Thus, when the sun bombards the upper layers of the earth's atmosphere with these high-speed clouds, radio broadcasts may be sent different distances than normally or lost altogether.

The instrument used in discovering these high-flying, radio storm clouds is a panoramic ionospheric recorder that sends out strong pulses of radiation into the upper atmosphere at adjustable intervals of 5 to 30 seconds.

A motion picture camera records the images registered on a cathode ray tube as the pulses are reflected from high above the earth in the ionosphere.

This pulse-ranging technique was the basis of radar, but the new equipment will detect atmospheric phenomena too swift for detection by earlier equipment.

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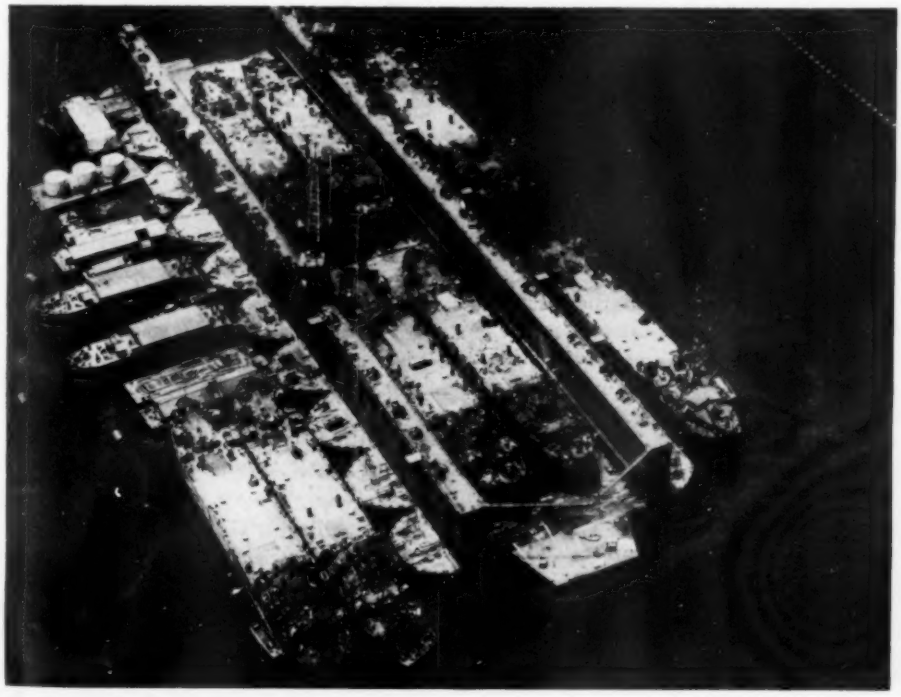

REPAIRS IN COMBAT—Nearly 7,000 ships, ranging in size from P-T boats to the 53,000-ton battleship U.S.S. Iowa, were lifted out of the water for damage repair and reconditioning by the Navy's seventy-seven floating drydocks in the combat zones during the last year of the war. The Advance Base Sectional Dock shown here has lifted four LSTs out of the water, and more are tied up for repairs.

ENGINEERING

Floating Drydocks Used In Combat Zones

➤ SEVENTY-SEVEN floating drydocks, towed into war zones, enabled the Navy to make on the spot repairs that saved much valuable time during the war, it has been revealed.

Vessels ranging in size from PT boats to battleships were among the 6,947 ships raised out of the water for repair jobs in combat zones during the last year of World War II, the Navy said.

Another 19 of the floating shipyards facilitated work on 1,349 warships at ports in the United States during the year beginning October, 1944. The program that began with three floating docks in 1940 found the Navy with 150 docks at the war's end with a capacity of 1,200,000 tons.

Huge ABSD's, Advance Base Sectional Docks, provided floating repair installations for the largest battleships and aircraft carriers in the fleet.

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MEDICINE

Cancer Cause Suggested

Strong indication of a virus cause of the dread disease has been obtained by mice and chick embryo studies. Leads thus far called well worth following.

➤ CANCER MAY be a virus, one of those submicroscopic disease-causing agents that are already known to be responsible for such other maladies as smallpox, yellow fever and the hoof and mouth disease of cattle. Evidence to this effect was presented at the American Chemical Society meeting by Prof. Roger J. Williams, director of the Biological Institute of the University of Texas.

First strong indication of a virus cause for cancer was obtained by Dr. Alfred Taylor of the institute staff who succeeded in inoculating incubating eggs with cancerous material from mice. A filtered extract from these eggs provoked new cancers when injected into healthy mice.

It has been found possible to keep the cancer-cultures going for many months by transplants from egg to egg, and the filtered extracts again caused cancers when re-injected into mice. Something (possibly the virus) emanates from these cancers and produces malignant growth in nearby tissues.

Various methods for separating out this virus, such as low-temperature drying and high-speed centrifuging, have been successful, but not consistently so. The material thus obtained does not always "take".

One highly suggestive result has been the production of cancers in rats from the mouse material—"cancers," Prof. Williams remarked, "which could not have arisen from the mouse material injected except through the agency of some virus-like cancer-producing agent." Again, however, results were not consistent.

Lack of wholly dependable results is not discouraging the Texas group of researchers. Leads thus far obtained are considered well worth following intensively.

Streptomycin Keeps Better

➤ STREPTOMYCIN, penicillin's new companion in the germ-fighting business, keeps better than penicillin, Dr. Peter P. Regna and Dr. Leonard A. Wasselle of the research laboratories of Charles Pfizer and Company, Brooklyn, reported. Well-dried streptomycin salts, containing less than one per cent of water, have shown no loss in strength after a year on the laboratory shelf.

Brittle Capillaries

➤ BRITTLE capillaries, which give rise to apoplexy if they break in the brain, or blindness if the hemorrhage occurs in the retina, can be restored to normal condition by the administration of rutin, a compound found in plants, the chemists were told by Dr. James F. Couch of the U. S. Department of Agriculture's eastern research laboratory at Philadelphia and Dr. J. Q. Griffith of the University of Pennsylvania. Success in the treatment of this disorder was obtained in a considerable number of cases whose subsequent histories were carefully followed.

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CHEMISTRY

More Powerful Than TNT

Called nitromethane, it is also much safer to handle. It is now made by mixing nitric acid and natural gas. Is now available for civilian use.

➤ NITROMETHANE, a high explosive much more powerful than TNT but much safer to handle, is now released from military restrictions and is available for civilian use, Harold Shechter of Purdue University announced at the meeting of the American Chemical Society. Mr. Shechter's colleagues in research leading to the cheaper and more efficient production of this useful detonating compound were H. B. Hass, L. G. Alexander and D. B. Hatcher.

Nitromethane, as its name implies, is the nitrated form of methane, which constitutes about 85% of most natural gas, and which, under the names of firedamp and marsh gas, has long been known as a peril in some coal mines. It is not at all new, having been first made in 1872; but production methods hitherto in use have not been efficient, and have used substances more expensive than methane, so that it has not been widely used where costs have to be counted. Mr. Shechter and his associates, treating methane with nitric acid under a pressure of 100 pounds per square inch, were able to obtain a very satisfactory yield.

Since natural gas costs only three cents a thousand cubic feet in Texas, and since many wartime plants built for the production of nitric acid are now standing idle, there is no good reason why nitromethane should not be turned out in any needed quantity at relatively low cost, Mr. Shechter pointed out.

Inactive Vitamin B_1

➤ RAW CLAMS, and some kinds of raw fish, inactivate thiamin, or vitamin B_1, changing it into a different compound that has no vitamin value to mammals, Prof. D. J. Hennessy of Fordham University told the chemists. He and his associates, S. Warner, Dr. K. G. Falk and J. Truhlar, were stimulated to start their investigation by reports of the curing of paralyzed young foxes that had been fed in part on raw fish when they were given heavy doses of thiamin. The other ingredients of the young foxes' rations contained plenty of this vitamin, but something in the raw fish destroyed its dietary value.

Thiamin mixed with raw fish disappeared in the same way when a direct laboratory test was made. Since civilized men seldom eat raw fish, but do eat raw shellfish, especially clams and oysters, the Fordham group tried the effects of these mollusks on thiamin. Thiamin mixed with oysters retained its power, but when mixed with clams it became valueless.

Chemical refining methods produced the compound into which the fish and clams had converted the thiamin. Prof. Hennessy has christened it "ichthiamin", which is a combination of the Greek "ichthus", meaning fish, with thiamin.

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Cheese was preserved in Germany by dipping in polyvinyl acetate emulsion.

CHEMISTRY

Atoms Make New Laws

Hot atoms have energies 10,000 times greater than atoms in ordinary chemical combinations and fly through solutions at enormous speed.

➤ HOT ATOMS from atomic nucleus transformations follow new rules of combination, Dr. W. F. Libby of the University of Chicago told the symposium on nuclear chemistry at the American Chemical Society's meeting.

These hot atoms, with energies 10,000 times greater than those involved in ordinary chemical reactions, fly through solutions at enormous speed, due to recoil from such nuclear explosions as the emission of gamma rays. Such speeds, Dr. Libby reports, make the particles collide with the atoms of the solution and ricochet like bullets hitting a wall.

New types of chemical combination, resulting from these high energy collisions, are rather simple and predictable, according to the Chinese scientist. They can be used to make a radioactive hot atom replace an ordinary atom, thus tagging a compound whose subsequent progress through chemical reactions or life processes can be watched by following its radioactive behavior.

Radioactive iodine, for example, can be made to enter the molecule of an organic compound, containing ordinary iodine. In most molecules the hot iodine will replace its non-radioactive counterpart. If, in some cases, hot iodine replaces a carbon or a hydrogen atom, the resulting compounds can be separated by chemical means.

Quick Selection of Drugs

➤ A PROBLEM similar to finger-print classification or cataloguing the plants and animals of the world is posed for the chemist by the half-million chemical compounds isolated from natural sources or prepared in the laboratory. Steps used in solving the problem of organizing all available chemical and pharmacological information on anti-malarial drugs were outlined by Miss Elinor D. Hartnell of the division of chemistry and chemical technology of the National Research Council, with headquarters at Baltimore.

Miss Hartnell told of the work done during 1941-1945 by the Survey of Anti-malarial Drugs operating under joint supervision of the National Research Council, the Board for the Coordination of Malarial Studies and the Committee on Medical Research of the Office of Scientific Research and Development.

"The rapidity with which new compounds were tested and the sudden emphasis, as new chemical types developed promise, necessitated the creation of a new classification system capable of indexing any chemical compound which the pharmacologist could devise and which the chemist could prepare," said Miss Hartnell.

Although the system was developed to show the relationship between anti-malarial activity and chemical structure, it is equally satisfactory for any problem involving the classification of miscellaneous compounds, Miss Hartnell claimed. It is far simpler and more versatile than the old German system which has been in use since about 1910.

Under the new system complete information on any one of the more than 14,000 different drugs tested for anti-malarial activity could be made available in less than one minute, Miss Hartnell reported. The new system, she adds, brings together for the first time all compounds having identical structural features.

The anti-malarial research was a coordinated wartime program with chemical and pharmaceutical companies, universities and the governments of the United States and allied countries taking part. The classification system of the compounds studied is to be published in monograph form.

Elastic Nylon

➤ NYLON, nearly as elastic as rubber, has been produced on an experimental scale, according to Dr. Emerson L. Wittbecker of the E. I. du Pont de Nemours & Company.

Emphasizing that the development was still in the laboratory stage, he said that the elastic nylon is made from N-substituted polyamides.

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Nylon rope, as a yachting rope, is expected to meet with great favor because of its strength, elasticity, and resistance to rot and marine decay.

UNBEATEN—This is Nordlicht, handsome German thoroughbred race horse that the Army recently displayed at Front Royal, Va. Army pedigree experts claim that Nordlicht is one of the finest horses ever produced in Europe and say that accurate records show that the five-year-old never lost a race. The American Jockey Club, final authority on horse racing in the United States, refuses to register the war prize, so Nordlicht's blood cannot be introduced into American racing breeds.

NUTRITION

Germs Become Guinea Pigs In Nutrition Tests

➤ GERMS INSTEAD of guinea pigs may be used in future tests of processed foods to show their nutritive value, Dr. R. A. Stewart and Dr. R. W. Carroll, of the Quaker Oats Research Laboratories, told members of the American Chemical Society. Promising results, they said, were obtained in preliminary tests, showing comparative growth responses of microorganisms fed on chemically modified amino acids, which are the building-blocks of proteins.

Other studies, made with the more conventional means of white rats as test organisms, showed that if cereals are overheated in toasting or other heat processing, the value of their amino acids is impaired. Ordinary chemical analyses failed to show the changes which these biological assays discovered.

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PHYSICS

Atomic Power for Future Super-Airliners

➤ URANIUM 235 and plutonium will power future super-airliners, if (and a very big if) successful international controls prevent diversion of atomic energy sources for purposes of war, prophesied Dr. Glenn T. Seaborg of the University of California and also of the Metallurgical Laboratory at the University of Chicago, co-discoverer of plutonium and of the new elements americium and curium.

"Denaturing" atomic energy materials, he told the American Chemical Society, will not turn the trick alone. It can only slow down possible conversion for military uses, but cannot wholly prevent it. For full control, to insure civilization's safety, only international agreements, firmly made and kept in good faith, will suffice. If this cannot be accomplished, it may be necessary to forbid completely all commercial applications of this revolutionary new energy source.

If the world can insure its own safety against misuse of atomic energy, revolutionary changes in industry such as the world has never seen are already at hand, the speaker declared. First will come application of atomic energy in large stationary plants, to generate electricity by driving turbine-connected generators. Then will come the propulsion of surface and submarine ships. Finally, after the atomic pile has been freed of the load of graphite now necessary for keeping the output of energy within safe bounds, the atomic-energy unit will sprout great wings and take to the upper air.

But none of these things can take place, without extreme peril to the whole world, until the necessary international controls can be worked out.

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ICHTHYOLOGY

Schools of Fish Studied By New Instrument

➤ ACTIVITIES of fish in the dark of night, deep in the water, under a coating of ice or in a muddy river will be brought to light by a new instrument. A combination light meter and photoelectric fish-detector, it incorporates the same "electric eye" that automatically opens doors and counts the number of passing autos.

Small and light in weight, this same instrument can be used in determining the extent to which the time at which certain types of fish migrate is influenced by the amount of sunlight reaching them, Dr. Arthur D. Hasler of the University of Wisconsin and Dr. Lester V. Whitney of Southwest Missouri State Teachers College state. (*Journal of Wildlife Management*, April).

To get more information on the relationship between migration and light, Dr. Whitney was asked to devise an instrument that would measure small quantities of light reaching three to four yards below the surface of the water at sunset. The apparatus he developed has already been used successfully to chart migration times of schools of perch in Lake Mendota.

Light intensity is measured by directing the photocell upward. The number of fish passing by are clocked by directing the cell horizontally toward the light source—each interruption of the beam is recorded. The cell itself is rotated by a cord reaching to the water's surface.

A dim light is used so that the fish will neither be attracted nor repelled unduly by the light source. The photocell and light source were placed as far apart as conveniently possible with a rowboat four feet wide.

The number of deflections per minute recorded by the photocell was in keeping with the number of fish caught either in gill nets over definite periods or by hand lines from the same or nearby boats.

Science News Letter, April 20, 1946

AERONAUTICS

VHF Transmitters Ready For Private Flying

➤ WITH THE Civilian Aeronautics Administration equipping airport traffic control towers for VHF (very high frequency) radio communications, compact, lightweight VHF equipment will fit conveniently into small private airplanes.

Being shown to flyers throughout the country by Bendix Radio, Baltimore, Md., VHF for private planes includes a small transmitter with a 26-inch vertical rod antenna.

While ground-to-air communication is not ready for VHF, the CAA program provides for immediate use of the very high frequency transmission from planes to ground stations.

Advantages claimed for VHF include all-weather reliability, no atmospheric static interference and greater transmission range for less power.

Science News Letter, April 20, 1946

IN SCIEN

MEDICINE

Rinderpest Vaccine Sent to China

➤ A MILLION doses of bacteriological warfare vaccine, which protects cattle against rinderpest, dread scourge of the Orient, has been sent to China through UNRRA, Maj. Gen. Alden H. Waitt, chief of the Army's Chemical Warfare Service, revealed.

Use of this war-developed protection against future famine in the Far East was made known when Gen. Waitt appeared as guest of Watson Davis, director of Science Service, on the CBS program, Adventures in Science.

"Rinderpest has many times decimated the cattle of great regions of Europe and Africa, leaving starvation in its wake," Gen. Waitt said. "The possibility existed that enemy agents would try to introduce this virus into the great cattle herds of the United States and Canada—and the paper balloons which floated over from Japan did not help to ease our anxiety. Our great difficulty was the lack of an effective vaccine, which could be produced in the quantity required to stop an epidemic."

Intensive research by our Special Projects Division, in collaboration with colleagues of the British Commonwealth, developed a revolutionary new method of producing the required vaccine in almost unlimited quantity.

"We no longer fear rinderpest in this country, for now its spread can be readily checked," Gen. Waitt said. "Of more immediate importance is the impact this discovery may have on the famine areas of India, China and the Pacific Islands. Now their cattle may be protected against this dread disease, and successfully employed as beasts of burden and as sources of food, in regions where they could not survive before."

A chemical that can save lives threatened by arsenic and mercury poisoning; an antidote to lethal doses of cyanide gas; and chemicals which promise to lead to better remedies for glaucoma, myasthenia gravis and Hodgkin's disease are also the peacetime benefits of wartime research in the Army's Chemical Warfare Service which were described by Col. John R. Wood, chief of the medical division, CWS, also a guest on the same program.

Science News Letter, April 20, 1946

NCE FIELDS

MEDICINE

Vitamin Lack Seen As Cancer Factor in Women

➤ LACK OF VITAMIN B_1, or thiamin, may be the first link in a chain leading via the liver and female hormone to cancer of the uterus, it is suggested in a report by Dr. J. Ernest Ayre and Dr. W. A. G. Bauld, of the Royal Victoria Hospital and McGill University, Montreal. (*Science,* April 12.)

If the theory proves correct it should be possible, by two simple tests, to determine 1. whether the woman has cancer; 2. if not, whether she is likely to develop cancer; and 3. whether she has a deficiency of thiamin. If the tests show a dangerous precancerous linkage between low vitamin and high female hormone concentrations, prevention of cancer might be possible through corrective treatment.

The vitamin lack might operate to start cancer by damaging the liver, the Canadian investigators suggest. The damage might be too slight to be detected by present tests of liver function, yet might be severe enough to keep the liver from inactivating female hormone. This material might therefore accumulate in the body and cause cancer of the uterus.

Studies of 23 patients plus findings by various scientists from studies of animals gives, the Canadian scientists state, "excellent circumstantial evidence to suggest that the nutritional deficiency may have been a primary factor leading to the malignancy."

Science News Letter, April 20, 1946

PUBLIC HEALTH

Watch Out for Ticks As Weather Warms

➤ THOSE OF YOU living where warm weather has come unusually early this year need to watch out for ticks earlier than usual, because it is the warm weather that brings these dangerous disease carriers out of their winter quarters. Rocky Mountain spotted fever and tick paralysis are diseases that may result from tick bite.

If there are ticks in your vicinity, it would be wise to make night and morning tick inspection part of the daily routine for the children and the family dog. Include any grown-ups who have been working in the shrubbery or underbrush or picnicking in the woods. Every part of the body and the clothing should be carefully inspected for ticks. If any are seen, use tweezers or piece of paper to remove them. Never use bare fingers as you can get the disease from handling infected crushed ticks.

Tick paralysis attacks children much oftener than grown-ups, the ratio being 10 to 1. It is thought to be due to a nerve poison which is produced by the tick and gets into the patient's body while the tick is attached for blood sucking.

The disease starts suddenly, sometimes with inability to walk or stand, sometimes with a kind of paralysis. Death may result in a few days. The important feature of treatment of this disease, physicians who have treated it state, is to find and remove the tick. If this is done early in the sickness, the patient will be well within one or two days. Delayed removal of the tick sometimes fails to save the patient.

Rocky Mountain spotted fever starts with a chill, headache, sweating, and pain in the abdomen, bones and muscles. Other symptoms are the mottled rash and fever. The sickness starts from two to 14 days after the virus causing it has entered the body.

Science News Letter, April 20, 1946

GENERAL SCIENCE

South Africa Organizes Research Council

➤ A SOUTH AFRICAN Council for Scientific and Industrial Research has been organized as a government body with Dr. B. F. J. Schonland, known for his researches upon lightning, as president.

The new body is an organization similar to councils that have been organized in Great Britain, Canada and Australia.

Attention will be given to development of agriculture, mining, and industry, as well as research in medicine, health and specialized scientific fields in universities and laboratories to be set up in the country.

While the new body is governmental in organization, it will administer research funds from industry and gifts intended to promote research.

Dr. Schonland will attend the British Empire Scientific Conferences in London in June as head of the South African delegation.

Science News Letter, April 20, 1946

GENERAL SCIENCE

Research Programs Need Governmental Support

➤ MAJOR RESEARCH programs must in future come to depend increasingly on government and industry for support, Prof. Hugh S. Taylor of Princeton University declared in an address before the University of Wyoming chapter of Sigma Xi, scientific research society of America. Privately endowed universities and other institutions, he explained, will no longer be able to carry the main burden of research because "the necessary techniques of modern science, involving the production and control of high energy sources, have become almost prohibitively expensive to endowed institutions."

Research looking to more or less immediate application to industrial problems can turn with confidence to industry for its support, Prof. Taylor told his audience. The first World War caused a general awakening to the wealth-giving possibilities of applied science, the interim between wars saw a great development of industrial laboratories and industrial fellowships in universities, and the second World War, just finished, added unmistakable emphasis to the lesson.

Support of basic research, without which the shorter-range programs of applied science must soon stagnate, offers somewhat more difficult problems, the speaker admitted. Fundamental research, he said, is rarely directly or immediately profitable, nor can it readily be made self-supporting. Its principal assets are long-range in nature; yet it is in such areas, free from the drive for profitable results, that freedom of inquiry and of spirit can best operate. Here, in Prof. Taylor's opinion, is where national and state support of research must come in.

Support of research, however, must not connote too close control by the supporting governments, he emphasized. Scientists must continue to be masters in their own households.

"But," he concluded, "masters in their own households, there lies upon them the paramount necessity of integrating their skills and their findings with the broad stream of life which flows outside the laboratories. In the free world to which we still dare to look forward we must integrate our skills with the social and spiritual aspects of human life and nature. That goal attained, we shall not lack either direction or support for the sciences."

Science News Letter, April 20, 1946

AGRICULTURE

Fryers In Any Season

Agricultural scientists are producing fluffy chicks at all seasons of the year, hens that lay the year-around, eight-pound turkeys and broad-breasted poultry.

By A. C. MONAHAN

See Front Cover

➤ FLUFFY LITTLE CHICKS and Easter both come in the Spring. Easter is at the height of the natural hatching season. It is also at the height of the normal laying days, which perhaps accounts in part for the heavy use of eggs at Easter for Sunday morning breakfast, customary in some sections, and for the Easter Monday egg-rolling.

But the association is, perhaps, diminishing. Agricultural scientists seem never content with nature's ways and are producing fluffy little chicks at all seasons of the year so frying chickens will always be obtainable. They are producing hens that lay the year-around, eight-pound apartment-house turkeys, and broad-breasted poultry with more white meat. Fluffy little chicks, like the one in the staff photograph on the front cover of this SCIENCE NEWS LETTER, will grow into hens that lay 300 or more eggs a year.

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Since science has entered the poultry field in the serious way it has in the past three decades, the former barnyard fowl has given first place in the poultry world to those on the modern chicken farm, where everything else takes a back seat to the poultry.

This does not mean that ordinary farmers are no longer raising eggs and poultry meat. Practically every farmer still has a flock, and some farmers have large flocks as a sideline to their dairy, beef or cash crop farming. It does not mean that village folks do not have their backyard chickens. It means that in widely scattered sections of the country, specialized poultry farms with thousands of chickens, or ducks, or geese, or turkeys are in operation, and all activities center about the poultry.

Cross-Breeding

There is little similarity between the modern hen and the miniature jungle fowl which provided the first skimpy chicken dinner some 5,000 years ago, and which still may be found in certain out-of-the-way places. Ever since the early colonists brought poultry to the Western Hemisphere there has been improvement by selection and cross-breeding. Nearly 100 years ago America had produced stock claimed to be superior to the usual poultry of Europe, by crossing birds brought by sailors from the Far East, the original home of the hen.

It is only within the past half-century or so, however, that scientists have given special thought to raising poultry as a commercial enterprise, only within the past generation that a special effort has been made to classify poultry information into a real science.

The growth of poultry courses in the state colleges of agriculture is an indication. The New York College of Agriculture at Cornell University established a regular course in poultry in 1891. Rhode Island State College gave the first specialized course in the country in 1898. By 1904, ten of the colleges had courses in poultry husbandry. For the past two decades or so all agricultural colleges have had collegiate courses, and short and extension courses as well.

This is not intended to convey the idea that poultry scientists are all college-connected or that all the advancement in poultry husbandry has been made by the agricultural colleges and the experiment station affiliated with them. Some of the most important work has been done by farmers and others specializing in poultry, many of whom, though not all, were college trained. Experts of the U. S. Department of Agriculture deserve special credit. Some of the most progressive results have been obtained from work at the U. S. Department of Agriculture's poultry farm at Beltsville, Md.

It was at this farm that the lightweight turkey suitable for small families was developed. Some of these birds have proved to be excellent layers that produce three or four times as many eggs in a year as do ordinary birds. Its eight-pound turkey will prove popular to apartment-house dwellers, and some day turkey eggs may sell on the market side by side with hen eggs.

Perhaps the first object of the poultry scientists was to breed hens with vigor to withstand the vicissitudes of life that are at the same time good layers. In this they have succeeded. Some 30 years ago a hen that produced 200 eggs in a year achieved state-wide fame; today, 300-eggs-a-year hens are becoming commonplace.

Efforts now seem to be focused on developing a better meat-producer, particularly birds with broader breasts and more of the highly favored white meat, but also with "meatier" drumsticks and wings. Breeders are following the footsteps of their fellow scientists in beef and hog development, who have succeeded in more than doubling the weight in usable meat on their animals.

The broad-breasted turkey is here and will soon become plentiful; the broad-breasted chicken is on its way. Promising results have already been obtained. Breeders have learned that the descendants of the common hen can be made to acquire new forms and colors. They developed the feeding and breeding formula that has added 30 eggs to the average hen's yearly production, and have found that in no branch of animal husbandry can results be obtained so rapidly as in the poultry industry.

An organized search for a hen that will have at least 10 per cent more meat than its present-day counterpart is un-

der way. It is headed by some 25 well-known poultry scientists with an equal number of sub-committee members and 600 poultrymen from all parts of the United States as advisers. The activities are financed, and awards will be given, by the Great Atlantic and Pacific Tea Company, which has a particular interest because of the tremendous amount of poultry products it handles each year. The undertaking, known as the Chicken-of-Tomorrow program, is a three-year undertaking covering 1948.

There are present indications that many war veterans, taking advantage of the GI Bill of Rights, desire to purchase land suitable for raising poultry and become chicken or turkey raisers. It is a good business for those with proper training. Poultry producing, in cash returns, is America's third largest agricultural industry. It brings in over $2,650,000,000 a year.

It is now producing considerably over an egg a day for every man, woman and child in the country, and also about 25 pounds of meat per person, but there is still room for expansion. Poultry and eggs are rated among the seven basic foods for the American diet, being rich in proteins, minerals and vitamins.

Double Consumption

Double the present consumption could well take place because, as every housewife knows, eggs are invaluable in many household kitchen dishes. Also there is room for an expansion in the export trade, particularly for dried eggs.

The common idea that anyone can raise poultry may be true, but whether or not they can do so successfully and secure an income is another question. Business men, professional men, sailors and admirals facing retirement, are common among the persons who look forward to a life of ease raising poultry.

As a hobby, a little chicken farm is a good idea. Some will be very successful. To be successful both brains and long hours of hard work are required, but no person seems to love his job more than the poultry lover with poultry instincts.

The veteran considering the poultry business as a means of livelihood needs to know what he is facing. If he likes poultry and long hours of work, and has a degree of training, he will probably succeed. Poultry farming is one of the best paying agricultural enterprises for the man who makes a go of it.

The fact that it is a 365-day-a-year job is an advantage if help is employed. It is year-around employment for the owner and the helper. Another advantage is that the business, except with turkeys, brings in cash every week. But even the turkey business is no longer just a Thanksgiving-and-Christmas seasonal market; the turkey demand now stretches over many months since Americans have learned to eat the bird at other times.

The job requires training. It is particularly important that diseased birds, and there are about 100 major diseases, be spotted in the daily inspection of the flock so that those with infectious difficulties can be removed before others are contaminated. Training in one of the state agricultural colleges is desirable, but if this can not be had, the next best procedure for the man without poultry experience is to get employment for a year on one of the large modern poultry farms, and supplement the practical experience with reading and perhaps with college correspondence courses.

Science News Letter, April 20, 1946

INVENTION

Rear View Mirror for Day or Night Driving

➤ A REAR view mirror for automobiles that gives clear vision in the daytime and glareless images from the brightest lights at night is the subject of patent 2,397,947, taken out by William H. Colbert, Brackenridge, Pa. The wedge-shaped mirror has two surfaces, one of relatively low reflectivity and transparent and the other a better reflector but opaque.

The front surface, the poorer reflector, is for night driving, while the back surface is for daylight. The driver can adjust the mirror for night or day driving by slightly tilting the mirror.

The patent has been assigned to Libbey-Owens-Ford Glass Company, Toledo, Ohio.

Science News Letter, April 20, 1946

CHEMISTRY

Modified Amino Acids Act Like Penicillin

➤ SOME MODIFIED forms of amino acids, instead of nourishing bacteria, check their growth more or less as penicillin does, Dr. Sydney Fox, and associates, of Iowa State College, told the American Chemical Society. One in particular, 3-amino tyrosine, was effective against *Staphylococcus aureus*, the germ of boils and some types of food poisoning, and at the same time was only slightly poisonous to white rats to which it was fed. This, of course, is what biologists seek of an antibiotic: to knock out the germs without making their victim sick.

Science News Letter, April 20, 1946

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Do You Know?

Electric *floodlights* near turkey roosts on one turkey farm kept foxes away.

Avalanches in the Himalayan mountains are the most terrifying in the world because often they are of tremendous size.

Chloroform is not easily ignited but at high temperatures it breaks down readily into hydrochloric acid and phosgene.

Mountain leather, a common name for the mineral paligorskite, is probably a variety of asbestos and can be used for many similar purposes.

Carbon tetrachloride, used as a cleaning solvent, may cause poisoning if used in quantities over an extended period in a small, improperly ventilated room.

Only about one-fifth of the length of body of the South American *electric eel* is taken up with its vital organs; the rest is occupied by its power plant.

Adrenochrome, a drug potentially useful as an adjunct to insulin for diabetics, has been made synthetically by a German chemist; its use permits the amount of insulin required to be reduced by more than one-half.

BOTANY

NATURE RAMBLINGS
by Frank Thone

Hidden Resources

➤ CHILDREN have to be "don'ted" so much, in their eager gathering of spring flower bouquets, that it is refreshing to be able to tell them to go ahead and pick all they want to of one kind of flowers.

These are the violets. Except where they are so sparse and scattered that children will hardly want to pick them anyway, it is all right to gather violets without even heeding the usual injunction to "leave a few for seed."

For violets form few seed from the bright attractive flowers that children delight in. That important job is well taken care of by a second crop of flowers of a totally different kind, that are produced in summer, after the showy flowers have had their day. These later flowers are small, inconspicuous, short-stemmed things that look like unopened buds. They hide under the leaves, near the ground, and they never open. They are fertilized internally with their own pollen, and produce abundant crops of seed without ever letting the world know about it. This form of flowering and fruiting is known to botanists as cleistogamy, which is Greek for "hidden marriage."

After these cleistogamous flowers have formed and ripened their seed, the violet plant often returns to the production of its showy flowers, and continues to bear them until stopped by really severe cold. People often exclaim over finding violets in autumn, but really there is nothing very remarkable about it. Violets come about as near being ever-blooming plants as any of our wild flowers. They will even bravely put forth their blue blossoms during a January thaw.

Violets, for all their delicate appearance, might well be chosen as symbols of hardihood and enterprise. They grow far up into the Arctic, and far up the highest mountains. There are violets that manage to grow in the wettest of marshes, other violets that prefer the dry scanty soil of stony hillsides, and still others that spring up and flower briefly among the harsh shrubs of the desert when its barren curse is lifted for a spell by the short spring rains. If the fact of survival is a testimony of fitness, the violet tribe must be among the fittest.

Science News Letter, April 20, 1946

1946

ELECTRONIC EQUIPMENT AND ACCESSORIES

By R. C. Walker

Offers a wealth of specific information about the various applications of electronic devices and their accessories. Every electrical engineer, mechanic and student wishing to keep in touch with modern progress will find this a worthy addition to his technical library.

393 pages *Illustrated* *1945* *$6.00*

PLASTICS—Scientific and Technological

By H. Ronald Fleck

The author has made a critical survey of literature and a correlation of scattered data of great value to chemists in the ever-growing plastics industry. Also particularly suited as a text for college courses on the scientific and technical aspects of plastics.

352 pages *Illustrated* *1944* *$6.50*

RUBBER IN ENGINEERING

A Symposium based on research by the Imperial Chemical Industries, Ltd.

This book has been designed to interest a wide variety of readers. Its main purpose is to furnish engineers with a general survey of the information available on the fundamental properties of rubber. Complete with graphs and tables.

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ENGINEERING

Lightweight Coal Car Made of Steel Alloy

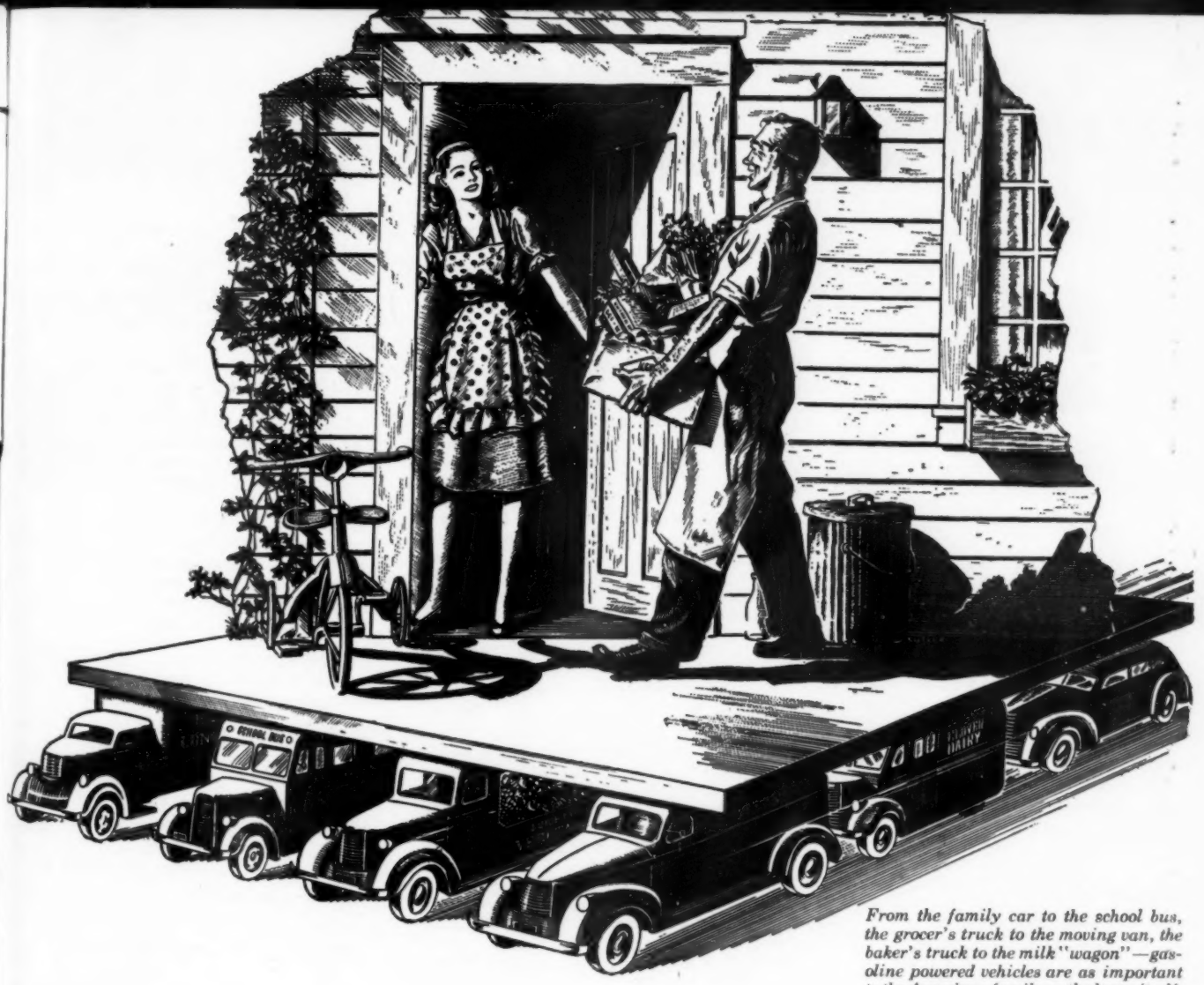
➤ AN ALL-WELDED coal car that is designed to eliminate 15% of the deadweight has been exhibited in Washington.

The new hopper, produced by the railroad research bureau of the United States Steel Corporation, has an empty weight of 33,500 pounds. That is 6,540 pounds less than standard cars built of carbon steel using Association of American Railroads specifications.

Constructed of Cor-Ten, a steel alloy, the new coal car is claimed to have high strength and corrosion resistance that will mean longer life.

The steel alloy permits thinner sections, while welded joints simplify construction and provide seals against moisture and eliminate laps, the car's designers report.

Science News Letter, April 20, 1946



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• Books of the Week •

ANATOMY OF RACIAL INTOLERANCE—George B. de Huszar, compiler—*H. W. Wilson,* 283 p., $1.25. Articles by recognized authorities discussing what race is, the causes of, and the remedies for, racial prejudice.

THE A PRIORI IN PHYSICAL THEORY—Arthur Pap—*King's Crown Press,* 102 p., $2. A study of the arguments involved among the different viewpoints regarding the nature of *a priori* truth.

A. S. T. M. STANDARDS ON PAINT, VARNISH, LACQUER, AND RELATED PRODUCTS—*American Society for Testing Materials,* 528 p., tables and illus., $2.75. Specifications; methods of testing; definitions of terms.

ATOMIC ENERGY AND WORLD GOVERNMENT—Leopold Infeld—*Canadian Institute of International Affairs,* 20 pages, 10 cents. A statement of the technical and international problems put to us by our possession of the atomic energy secret; and a plea for international organization and cooperation as a solution to that problem.

COLOR MEASURE: AND ITS APPLICATION TO THE GRADING OF AGRICULTURAL PRODUCTS—Dorothy Nickerson—*U. S. Dept. of Agric.,* 62 p., diagrs. and illus., 25 cents. A handbook on the method of disk colorimetry. U. S. Dept. of Agric., miscellaneous pub. 580.

A DESCRIPTIVE CATALOG OF THE SHORE FISHES OF PERU—Samuel F. Hildebrand—*Smithsonian Inst.,* 530 p., maps and illus., $1.25. United States National Museum, Bull. 189.

EGG TO CHICK—Millicent E. Selsam—*International Publishers,* 32 p., illus., $1. The changes that take place from the time the egg is laid until the chick pecks its way out of the shell are described in clear, lively text, accompanied by pictures drawn by Frances Wells. Suitable for boys and girls from 6 to 10 years old.

ENERGY SPECTRA OF STARS—C. G. ABBOT—*Smithsonian Inst.,* 6 p., diagrs., 10 cents. Smithsonian Miscellaneous Collections, Vol. 104, No. 22.

THE FRESH-WATER FISHES OF SIAM, OR THAILAND—Hugh M. Smith—*Smithsonian Inst.,* 622 p., tables and illus.. $1.50. United States National Museum, Bull. 188.

HEARINGS BEFORE THE SENATE SPECIAL COMMITTEE ON ATOMIC ENERGY ON S. 1717: Part 4—*Government Printing Office,* 69 p., 15 cents. Statements of Mrs. Harold A. Stone, Mrs. Allen C. G. Mitchell, John C. Parker, Dr. Ralph McDonald, Mrs. Harper Sibley, Commander Stephen Brunauer, Maj. Gen. L. R. Groves.

HEARINGS ON SCIENCE LEGISLATION (S. 1297 and Related Bills): Part 6—*Government Printing Office,* 13 p., 5 cents. Testimony of the high school students who were finalists in Science Service's Fifth Science Talent Search for the Westinghouse Scholarships.

HOW TO KEEP YOUR FAMILY HEALTHY—*Franklin Watts,* 95 p., illus., $1. An informative, fully illustrated, easy-to-understand handbook of health problems; written by recognized medical authorities and assembled from articles in LOOK magazine.

JOURNAL OF THE HISTORY OF MEDICINE AND ALLIED SCIENCES—George Rosen, Editor—*Henry Schuman,* Quarterly, $7.50 a year. A first issue of a new Journal.

OMAHA BEACHHEAD—*Government Printing Office,* 167 p., illus., and maps, $1.50. The authentic history of the first seven days (6 June-13 June, 1944) of the U. S. invasion of fortress Europe. The book covers every phase from the landing on the Normandy Coast through the hedgerow fighting to the Forest of Cerisy and Carentan.

THE PHYSIOLOGY OF SEX—Kenneth Walker—*Penguin,* 183 p., 25 cents. A clear, straightforward statement of the facts of sex and its problems in the life of the individual and the community. Though Dr. Walker writes strictly as a scientist for adult readers, he confesses his own belief that the questions raised cannot be satisfactorily answered in a world that is empty of spiritual values.

REHABILITATION AT LAKE TOMAHAWK STATE CAMP: A History—Harold Holand—*Nat'l. Tuberculosis Assn.,* 46 p., tables and illus., $1. The story of how the state of Wisconsin has sponsored a colony-type project for the rehabilitation of tuberculosis convalescents.

SCHISTOSOMOPHORA IN CHINA, WITH DESCRIPTIONS OF TWO NEW SPECIES AND A NOTE ON THEIR PHILIPPINE RELATIVE—Paul Bartsch—*Smithsonian Inst.,* 7 p., tables and illus., 10 cents. Smithsonian Miscellaneous Collections, Vol. 104, No. 20.

SCIENTIFIC INSTITUTIONS, SOCIETIES AND RESEARCH WORKERS IN THE NETHERLANDS INDIES—Frans and J. G. Verdoorn—*Board for the Netherlands Indies, Surinam, and Curacao,* 34 p., free. A list of the items given in the title. Reprinted from SCIENCE AND SCIENTISTS IN THE NETHERLANDS INDIES.

THE SOLDIER TAKES A WIFE—Planned *Parenthood Assn.,* illus., 20 p., 10 cents. A statement of the arguments in favor of the planning of one's family.

TESTING PRECIOUS METALS—C. M. Hoke—*Jeweler's Technical Advice Co.,* 92 p., illus., $2, 3rd ed. The identifying, buying, and selling of gold, silver, and platinum metals. A handbook for the jeweler, dentist, antiquarian, and layman.

THEORY OF LIE GROUPS: Vol. I—Claude Chevalley—*Princeton Univ. Press,* 217 p., $3. A systematic treatment of the mathematical theory from a global point of view.

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CHEMISTRY

Detects Impurities

Ultraviolet light used in seeking out almost incredibly small percentages of aluminum in other metals, American Chemical Society told.

➤ ULTRAVIOLET LIGHT, causing dyestuffs to shine with ghostly visible radiations in the dark, has been put to use in detecting almost incredibly small percentages of aluminum existing as impurities in steels, bronzes and other metals, where its presence may be a weakening factor. The new method was reported before the meeting of the American Chemical Society by Alfred Weissler of the Naval Research Laboratory and Prof. Charles E. White of the University of Maryland.

The metal sample is first dissolved, usually in an acid bath; then the dyestuff is mixed with it and the ultraviolet lamp is turned on. The fluorescent light will betray the presence of aluminum if it is present in the original material in dilutions as low as a thousandth of one per cent. From this up to about one per cent is a range in which the fluorometric method can be used to advantage for quick determination of aluminum. Advantages claimed are "speed, sensitivity, accuracy and freedom from interference."

Germ-Killer from Tomatoes

➤ TOMATOES, good for you because of their vitamin content, may play another part in adding to health through production of an anti-germ remedy, it appears from a report by Thomas D. Fontaine, George W. Irving, Jr., and S. P. Doolittle, of the U. S. Department of Agriculture.

These scientists have isolated from the tomato plant a new antibiotic, or material of the penicillin class, which they call tomatin. In test tube experiments it has marked activity against germs of both the gram positive and gram negative groups. It is also particularly active against some of the fungi that cause disease in plants and animals.

Athlete's Foot Remedy

➤ DISCOVERY that a vitamin K-like substance exerts a powerful action on the four fungi that commonly are responsible for athlete's foot, was reported by Milton J. Golden and Kurt A. Oster of the research laboratories of McKesson and Robbins, Inc., Bridgeport, Conn., at the meeting of the biological chemistry division.

They said laboratory tests on market preparations for curing the common skin ailment showed that most substances used have a ceiling of activity. Thus, after a certain amount of a remedy has been applied, additional amounts do not exert any more influence.

Science News Letter, April 20, 1946

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·New Machines And Gadgets·

⚙ *DUSTING MOP for household floors has suction similar to that of the ordinary vacuum cleaner for rugs. The triangular mopping pad is covered with a low-fitting housing through which the dust from the mop is pulled by the motor fans into a dust bag.*

Science News Letter, April 20, 1946

⚙ *TWEEZER SPOT welder, a 25-pound portable machine, has a pair of insulated copper tweezers at the end of a flexible cord, and also a foot switch. The tiny pieces of metal to be united are held in tight contact by the tweezers, and the foot lightly pressed on the switch.*

Science News Letter, April 20, 1946

⚙ *POWER-DRIVEN plane, a hand tool of the bench plane type, has a flat disk with cutting edges set in its base, and an electric motor above the center of the plane's block to rotate the disk. Fan blades, also rotated by the motor, discharge the chips and keep the motor cool.*

Science News Letter, April 20, 1946

⚙ *TOOTHBRUSH attachment is a drip cup device that prevents liquids on the brush from running down the handle to the annoyance of the user. The elongated cup has an opening in its base through which the handle of the brush is passed. Elastic edges on the opening prevent leakage.*

Science News Letter, April 20, 1946

⚙ *TOY PIANO, claimed to be the first one with a chromatic scale, has gleaming plastic keys in a keyboard that*

covers almost 2½ octaves. It is a miniature grand in shape, as can be seen in the picture, and has removable legs so that it can be rested on a table.

Science News Letter, April 20, 1946

⚙ *MOTOR-DRIVEN typewriter eraser has an elongated housing in which is a tiny motor and drive shaft. The circular eraser, of ordinary desk size, is mounted on the end of an extended flexible drive shaft which permits it to be turned at various angles. Speed is controlled by a rheostat.*

Science News Letter, April 20, 1946

⚙ *TREE GUARD protects the tender bark of young trees from rabbits and other bark-eating animals. It is a strong, curled fiber sheet of hard, tough material, split on one side. Held open while being placed around the tree trunk, it snaps back into position when released.*

Science News Letter, April 20, 1946

⚙ *WEED EXTRACTOR resembles an ordinary cane with a pivoted short crossarm near its lower end. One end of this crossarm rests on the soil; the other is bent downward at a right angle, forming, with the end of the cane itself, a pair of jaws to grasp the weed.*

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 307.*

Science News Letter, April 20, 1946

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